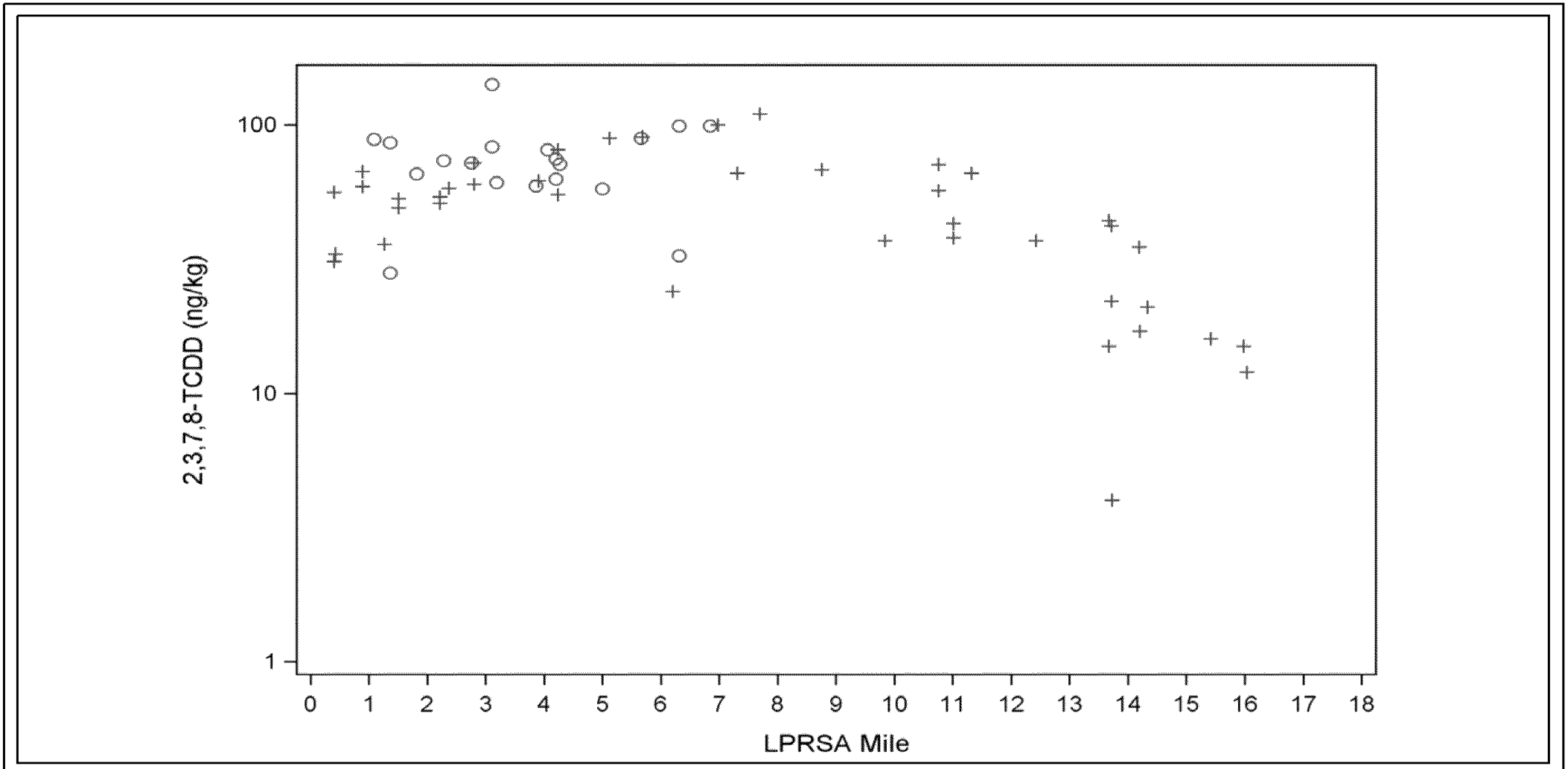
Briefing on Fish and Crab Tissue Data in the Lower Passaic River Study Area Relative to Decision-Making in the USEPA's Revised Focused Feasibility Study (FFS)

The available fish and crab tissue chemistry data for the Lower Passaic River Study Area (LPRSA) are not sufficient to appropriately and reasonably evaluate any spatial or temporal trends in the concentrations of chemicals of concern. Nearly all of the fish and crab tissue data were collected during only two sampling periods ---1999/2000 (Tierra/USEPA) and 2009/2010 (CPG/USEPA). For each of these sampling events/periods, the species and spatial area of the river sampled differed. In 1999/2000, Tierra sampled only the lower 6 miles of the LPRSA, and collected primarily marine/estuarine species. In 2009/2010, the CPG focused primarily on the upper 11 miles of the LPRSA and collected primarily freshwater/estuarine species. The CPG collected some data from the lower 6 miles of the LPRSA in 2009/2010 for three of the edible fish/shellfish species that were sampled by Tierra in 1999/2000. These species include white perch (resident fish species), American eel (migratory fish species), and blue crab (resident shellfish species). The summary statistics for concentrations of 2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin (TCDD) and total polychlorinated biphenyls (PCBs) in these species are provided in Table 1 for the entire LPRSA, and Table 2 the lower 8 miles of the LPRSA only.

Because there are limited tissue data from only two time periods to compare, it is not possible to conduct a reasonable statistically-based evaluation of potential trends in chemical concentrations. However, in looking at the averages for the LPRSA as a whole and the lower 8 miles only for these species (Tables 1 and 2), it appears that there may be a downward trend in the overall concentrations of both TCDD and PCBs. Figures 1 and 2 show blue crab TCDD and total PCB data by river mile and time period for the LPRSA. Data for this species are the most robust in terms of sample numbers and spatial overlap between the 1999/2000 and 2009/2010 sampling events. It appears in the graphs for both TCDD and PCBs that the concentrations are generally lower in 2009/2010 than they were in 1999/2000.

Determination of whether a trend in fish and crab tissue data does or does not exist is critical to drawing any conclusions regarding future risks in the river, and for consideration related to any remedial actions. A trend analysis would require more tissue data to be collected for the same species throughout the LPRSA. Maxus proposes that such a dataset be collected in 2014, and that such data be considered in the FFS before it is issued and risk/remedial decisions are made. Maxus's consultants are presently preparing a conceptual plan for a focused 2014 tissue sampling program aimed at providing the appropriate data to conduct a tissue chemistry trends analysis. Maxus will provide this conceptual plan to USEPA for consideration next week.



Notes:
LPRSA = Lower Passaic River Study Area
ng = nanogram ; kg = kilogram
TCDD = tetrachloro-*p*-dibenzodioxin

Year of Sampling ○ 1999-2001 + 2009-2010

Lower Passaic River Study Area
Bioaccumulation Model

2,3,7,8-TCDD in Blue Crab (Whole Body Soft Tissue)

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FIGURE
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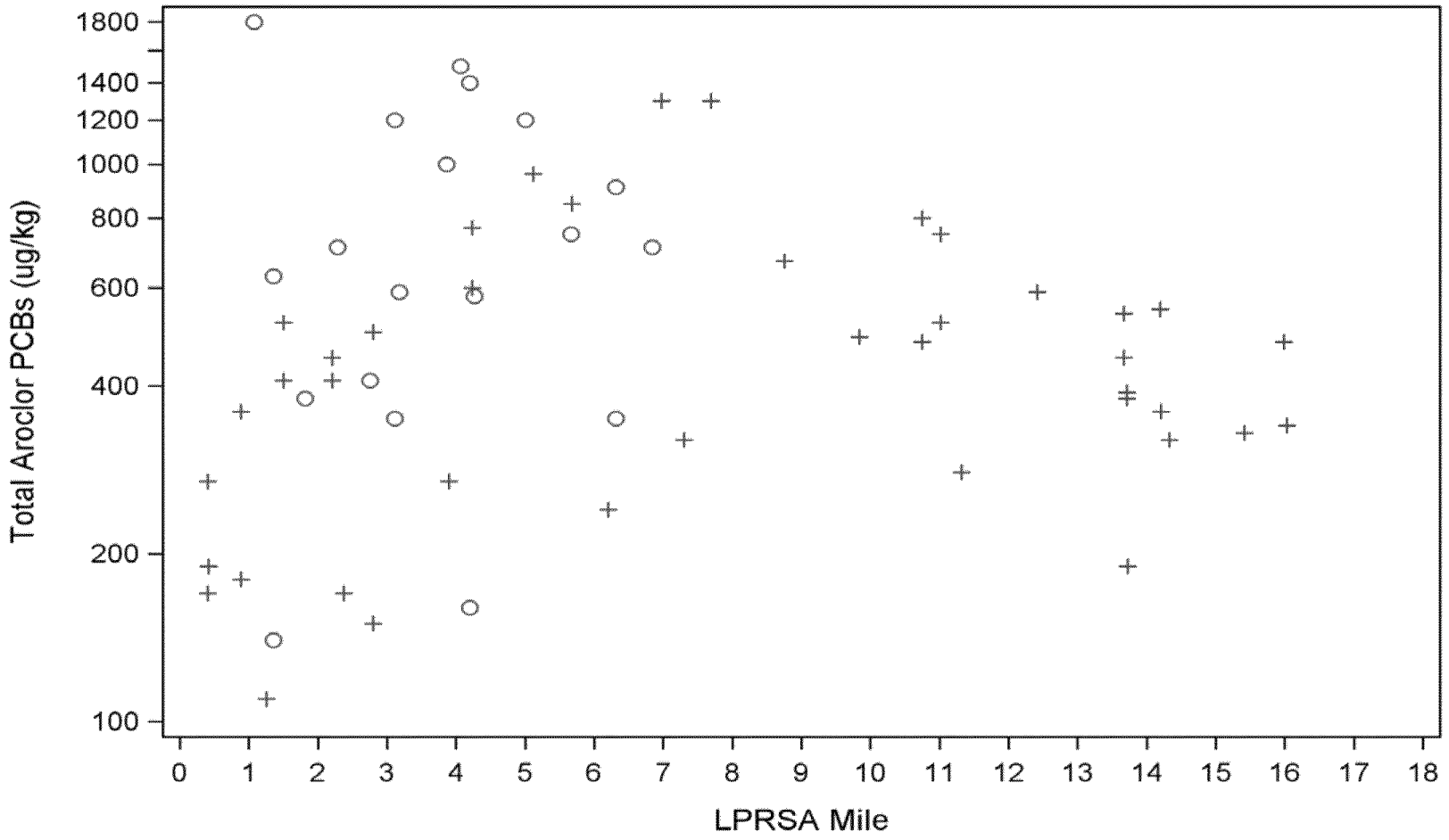

Notes:
LPRSA = Lower Passaic River Study Area
µg = microgram ; kg = kilogram
PCB = polychlorinated biphenyl

Year of Sampling ○ 1999-2001 + 2009-2010

Lower Passaic River Study Area
Bioaccumulation Model

Total PCBs (7 Aroclors) in Blue Crab (Whole Body Soft Tissue)

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FIGURE
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Table 1. Tissue Concentrations in Selected Species Collected in the Lower Passaic River Study Area (LPRSA) by Sampling Period

Chemical	Species	Tissue Type	Sampling Period	N	Number of Detects	Frequency of Detection	Mean	Standard Deviation	Minimum	Maximum
2,3,7,8-TCDD (ng/kg)	American Eel	Fillet	1999-2001	7	7	100%	21.7	6.49	14.6	32.2
	American Eel	Fillet	2009-2010	32	32	100%	13.5	9.84	0.31	41
	American Eel	Whole Body	1999-2001	6	6	100%	9.7	6.34	4.53	20.6
	American Eel	Whole Body	2009-2010	19	18	95%	16.8	15.0	0.11	47
	Blue Crab	Hepatopancreas	1999-2001	15	15	100%	262	45.0	195	371
	Blue Crab	Hepatopancreas	2009-2010	7	7	100%	143	63.8	41	210
	Blue Crab	Muscle	1999-2001	18	18	100%	17.6	3.94	10.9	22.7
	Blue Crab	Muscle	2009-2010	21	21	100%	7.48	5.65	0.82	20
	Blue Crab	Whole Body (Soft Tissue)	1999-2001	19	19	100%	75.0	24.8	28	141
	Blue Crab	Whole Body (Soft Tissue)	2009-2010	41	41	100%	49.2	25.0	4	110
	White Perch	Fillet	1999-2001	6	6	100%	64.9	22.2	34.4	88.9
	White Perch	Fillet	2009-2010	19	19	100%	41.0	24.1	3.6	99
	White Perch	Whole Body	1999-2001	18	18	100%	212	81.1	73.6	352
	White Perch	Whole Body	2009-2010	19	19	100%	129	71.5	18.0	250
Total PCBs (ug/kg)	American Eel	Fillet	1999-2001	7	7	100%	1,624	745	670	2,800
	American Eel	Fillet	2009-2010	32	32	100%	1,185	882	310	4,900
	American Eel	Whole Body	1999-2001	6	3	50%	810	710	75	1,700
	American Eel	Whole Body	2009-2010	19	19	100%	1,849	1,681	670	7,500
	Blue Crab	Hepatopancreas	1999-2001	15	15	100%	5,513	1,958	3,200	11,000
	Blue Crab	Hepatopancreas	2009-2010	7	7	100%	3,300	1,233	1,200	5,100
	Blue Crab	Muscle	1999-2001	18	4	22%	64	22	16	75
	Blue Crab	Muscle	2009-2010	21	19	90%	31	27	3.5	100
	Blue Crab	Whole Body (Soft Tissue)	1999-2001	19	19	100%	777	467	140	1,800
	Blue Crab	Whole Body (Soft Tissue)	2009-2010	41	41	100%	473	277	110	1,300
	White Perch	Fillet	1999-2001	6	6	100%	842	179	600	1,100
	White Perch	Fillet	2009-2010	19	19	100%	551	298	190	1,300
	White Perch	Whole Body	1999-2001	18	18	100%	3,989	1,821	1,200	10,000
	White Perch	Whole Body	2009-2010	19	19	100%	2,308	1,124	470	4,200

Notes: Includes all samples collected in the river. The 1999-2001 sampling events include the 1999 Late Summer/Early Fall RI-ESP Sampling Program; the 2000 Spring RI-ESP Sampling Program; andthe 2001 Supplemental RI-ESP Biota Sampling Program. The 2009-2010 sampling period includes samples collected by the Cooperating parties group during that period. 1/2 detection limit substituted for non-detected values. Field duplicate results were averaged. Total PCB concentrations are the sum of 7 Aroclors.

Table 2. Tissue Concentrations in Selected Species Collected in the Lower Passaic River below LPRSA Mile 8 by Sampling Period

Chemical	Species	Tissue Type	Sampling Period	N	Number of Detects	Frequency of Detection	Mean	Standard Deviation	Minimum	Maximum
2,3,7,8-TCDD (ng/kg)	American Eel	Fillet	1999-2001	7	7	100%	21.7	6.49	14.6	32.2
	American Eel	Fillet	2009-2010	16	16	100%	14.9	9.91	4.70	41
	American Eel	Whole Body	1999-2001	6	6	100%	9.7	6.34	4.53	20.6
	American Eel	Whole Body	2009-2010	8	8	100%	24.8	13.2	5.70	47
	Blue Crab	Hepatopancreas	1999-2001	15	15	100%	262	45.0	195	371
	Blue Crab	Hepatopancreas	2009-2010	5	5	100%	176	34.4	130	210
	Blue Crab	Muscle	1999-2001	18	18	100%	17.6	3.94	10.9	22.7
	Blue Crab	Muscle	2009-2010	11	11	100%	11.10	5.23	3.80	20
	Blue Crab	Whole Body (Soft Tissue)	1999-2001	19	19	100%	75.0	24.8	28	141
	Blue Crab	Whole Body (Soft Tissue)	2009-2010	22	22	100%	61.6	22.1	24	110
	White Perch	Fillet	1999-2001	6	6	100%	64.9	22.2	34.4	88.9
	White Perch	Fillet	2009-2010	11	11	100%	48.9	22.5	22.0	99
	White Perch	Whole Body	1999-2001	18	18	100%	212	81.1	73.6	352
	White Perch	Whole Body	2009-2010	10	10	100%	158	45.8	73.0	250
Total PCBs (ug/kg)	American Eel	Fillet	1999-2001	7	7	100%	1,624	745	670	2,800
	American Eel	Fillet	2009-2010	16	16	100%	1,271	1086	450	4,900
	American Eel	Whole Body	1999-2001	6	3	50%	810	710	75	1,700
	American Eel	Whole Body	2009-2010	8	8	100%	2,780	2,299	760	7,500
	Blue Crab	Hepatopancreas	1999-2001	15	15	100%	5,513	1,958	3,200	11,000
	Blue Crab	Hepatopancreas	2009-2010	5	5	100%	3,900	725	3,200	5,100
	Blue Crab	Muscle	1999-2001	18	4	22%	64	22	16	75
	Blue Crab	Muscle	2009-2010	11	11	100%	40	30	17	100
	Blue Crab	Whole Body (Soft Tissue)	1999-2001	19	19	100%	777	467	140	1,800
	Blue Crab	Whole Body (Soft Tissue)	2009-2010	22	22	100%	477	353	110	1,300
	White Perch	Fillet	1999-2001	6	6	100%	842	179	600	1,100
	White Perch	Fillet	2009-2010	11	11	100%	649	319	190	1,300
	White Perch	Whole Body	1999-2001	18	18	100%	3,989	1,821	1,200	10,000
	White Perch	Whole Body	2009-2010	10	10		2,630	748	1900	4,200

Notes: Includes only samples collected below LPRSA river mile 8. The 1999-2001 sampling events include the 1999 Late Summer/Early Fall RI-ESP Sampling Program; the 2000 Spring RI-ESP Sampling Program; andthe 2001 Supplemental RI-ESP Biota Sampling Program. The 2009-2010 sampling period includes samples collected by the Cooperating parties group during that period. 1/2 detection limit substituted for non-detected values. Field duplicate results were averaged. Total PCB concentrations are the sum of 7 Aroclors.